(12) UK Patent Application (19) GB (11) 2 180 217 (13) A

(43) Application published 25 Mar 1987

(21) Application No 8622011

(22) Date of filing 12 Sep 1986

(30) Priority data

(31) 2399/85 (32) 12 Sep 1985 (33) AU

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(51) INT CL[4]
B65D 33/36

(52) Domestic classification (Edition I)
B8K 2K1 2M 2X1 FC
B8P K9
U1S 1364 B8K B8P

(56) Documents cited

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(58) Field of search
B8K
Selected US specifications from IPC sub-class B65D

(54) Containers for hydraulic fluids

(57) A container for hydraulic fluid consists of a closed flexible bag 2 for containing the fluid, and an outlet fitting for dispensing fluid from the bag 2. The material of the bag 2 is such that it prevents water from penetrating it, and the outlet fitting includes a flexible tube 8 which may be secured in a bung 6 in a sleeve 4 attached to the bag 2. The flexible tube 8 is preferably sealed closed at its end 10 remote from the bag 2 during storage. A clamp 12 seals the flexible tube 8 when the end 10 has been cut off to dispense fluid. The bag 2 is preferably located within a protective box, the bag 2 collapsing as fluid is dispensed from it through tube 8.

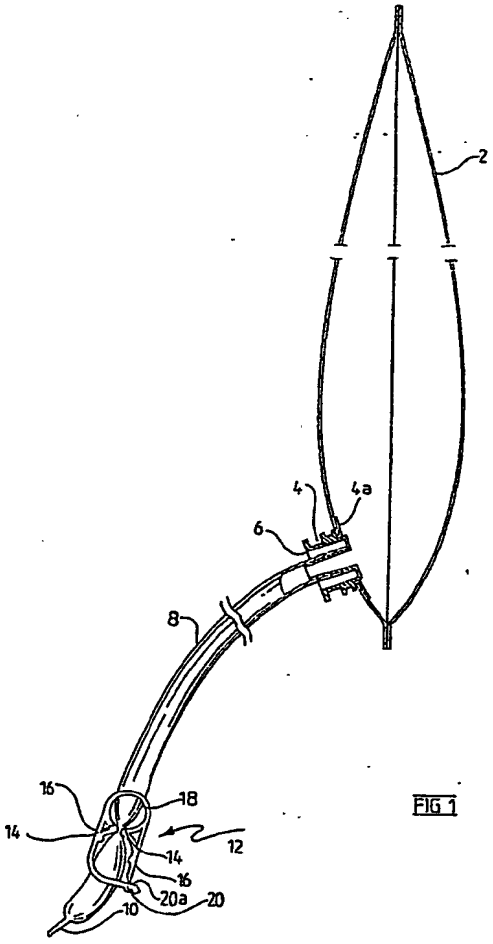

FIG 1

GB 2 180 217 A

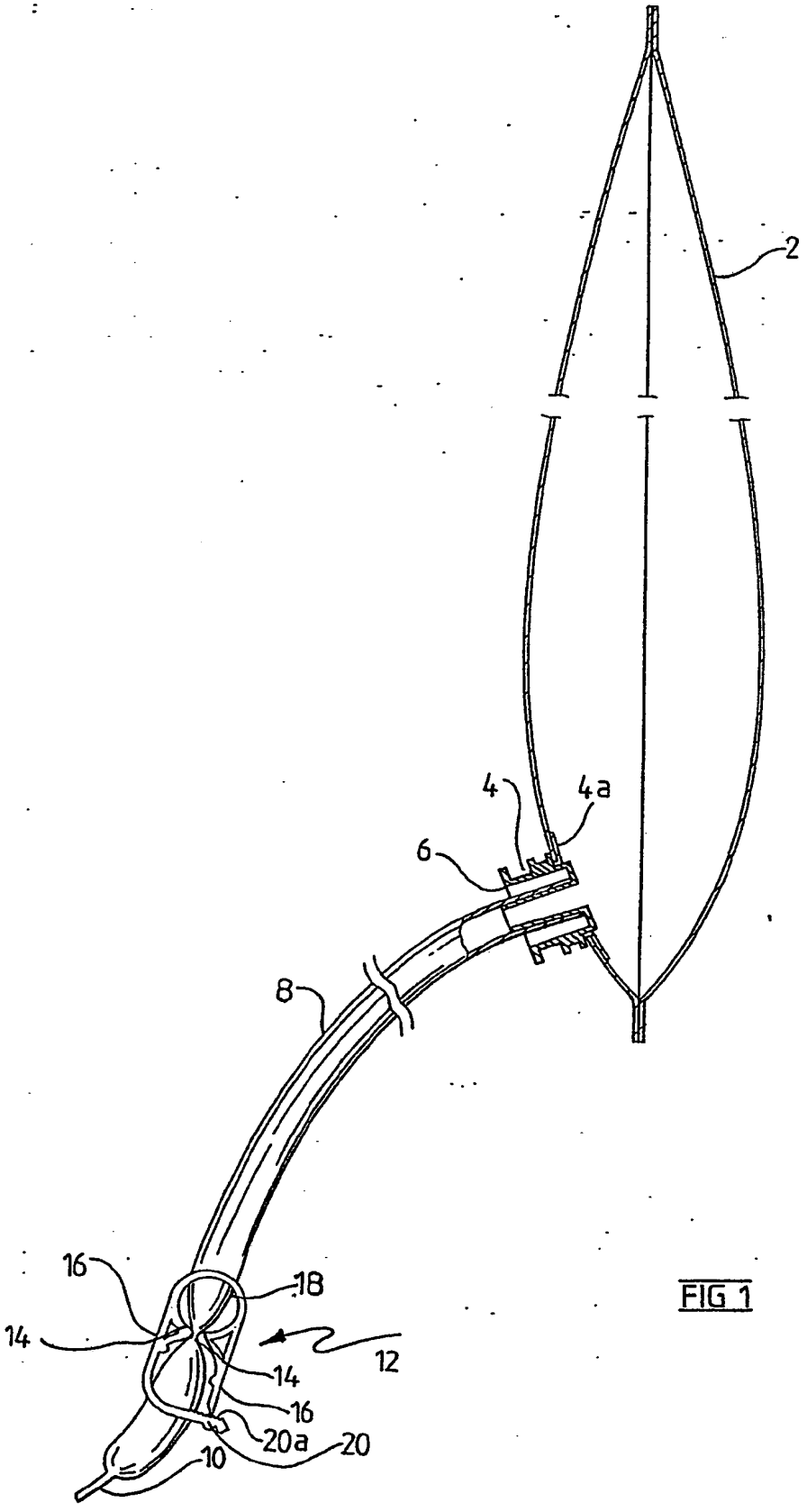

FIG 1

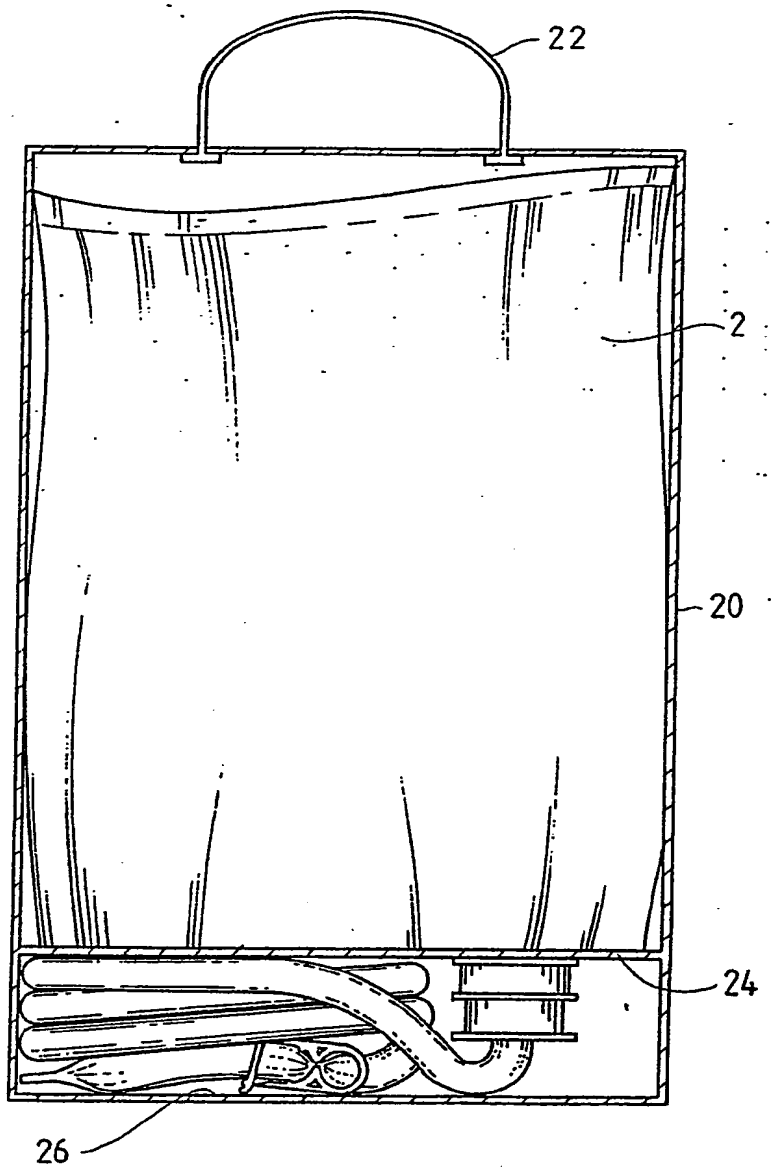

FIG 2

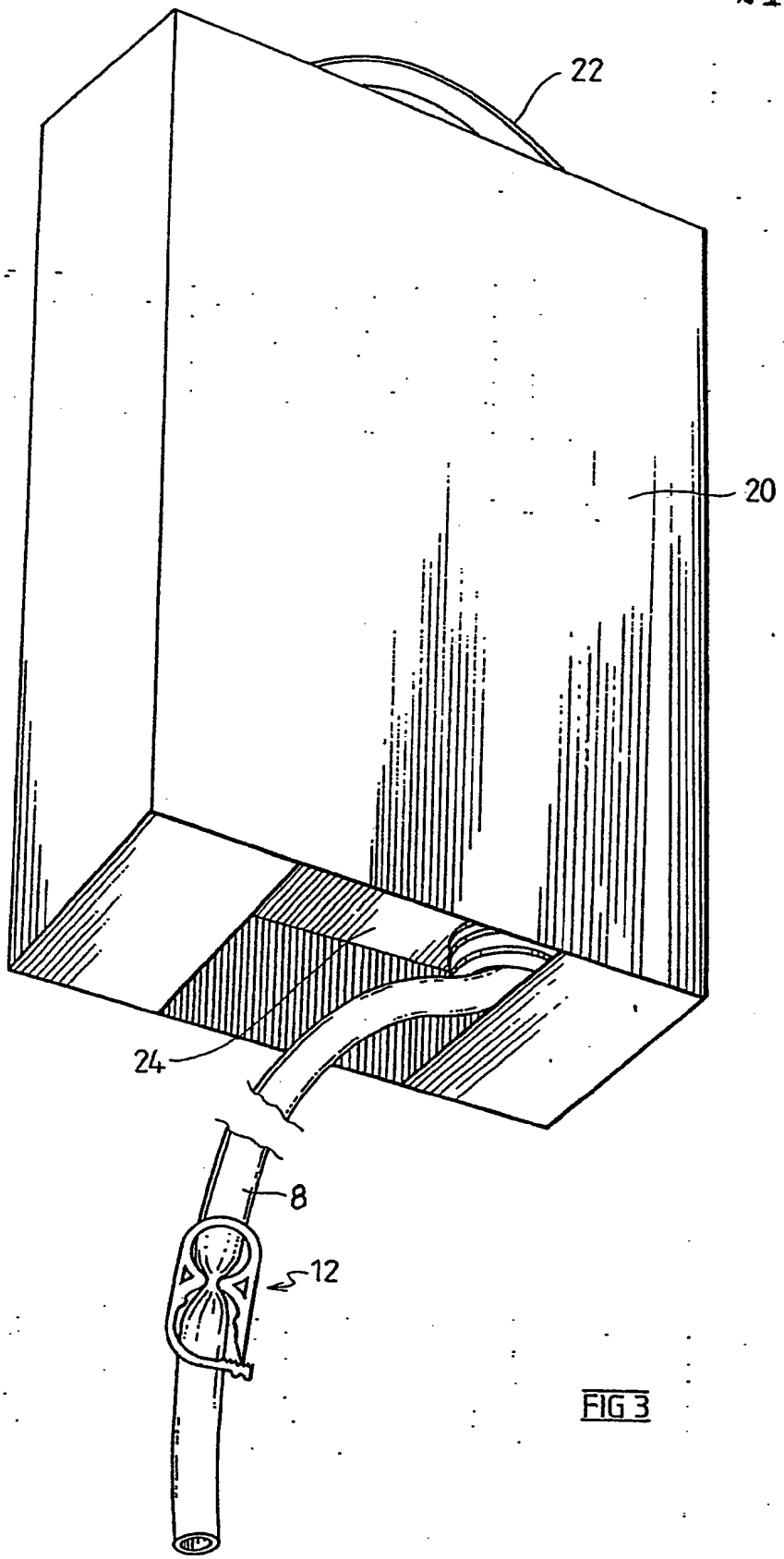

FIG 3

SPECIFICATION

Containers for hydraulic fluids

The present invention relates to containers for hydraulic fluids, more particularly, brake fluids.

Brake fluids and other hydraulic fluids tend to be very hydroscopic, a typical formulation for brake fluid including glycol ether, borate ester of glycol ether and organic, primary and secondary amines. Brake fluids are usually supplied in screw topped containers. Atmospheric moisture absorption is a particular problem when the container is part empty and is not tightly capped; in these circumstances, the effective "shelf-life" of the product is substantially reduced.

According to the present invention there is provided a container for hydraulic fluid, said container comprising a closed flexible bag for containing the fluid, said bag being composed of a material which is inert with respect to hydraulic fluid and which is able to prevent moisture penetration to the interior of the bag, and an outlet fitting for dispensing of fluid from the bag, said outlet fitting including a flexible tube.

Preferably, the tube is sealed closed at its outer end, said end being removable, for example by cutting, in order to permit discharge of fluid.

Preferably, clamping means are provided in order to close the tube by squeezing the tube.

Further according to the present invention, there is provided a package comprising a closed flexible bag containing hydraulic fluid, said bag being composed of a material which is inert with respect to the hydraulic fluid and which is capable of preventing penetration of moisture through the bag wall, an outlet fitting leading from the bag for dispensing the fluid, and means for providing a seal against discharge of fluid through the outlet fitting.

Preferably, the outlet fitting includes a flexible tube sealed at its outer end, said end being removable, for example by cutting, in order to permit discharge of fluid. The tube preferably carries clamping means for closing the tube by squeezing the tube whereby to permit controlled dispensing of fluid after removing the seal end. The bag and tube may be supplied in a box having a handle by which the box may be hung for dispensing of the fluid, with the tube being suspended from the box.

An embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 is an elevation partly in section showing a bag and dispensing tube of a container in accordance with the invention;

Figure 2 is a section showing the bag and tube stored in a box; and

Figure 3 is a perspective view showing the box in a position for dispensing the fluid.

As shown in Figure 1 of the drawings, a container for brake fluid or other hydraulic fluid comprises a flexible bag 2 composed of a material which is inert with respect to the particular fluid and which has high barrier properties against penetration of moisture. A tubular outlet sleeve 4 extending from the bag wall receives a bung 6 as a tight friction fit so that the bung is sealed within the sleeve. The bung 6 includes a tubular outlet spigot to which is attached to a length of flexible tubing 8. The tubing 8 is of a slightly smaller internal diameter than the external diameter of the spigot, so that the tubing 8 is a tight sealing fit on the spigot, the spigot preferably being barbed in order to prevent inadvertent removal of the tube. The outer end of the tubing is sealed, for example by means of a heat seal 10 or by means of a plug sealed within the end of the tubing.

Suitable material for forming the bag comprises an aluminium foil laminate sheet consisting of layers of biaxially oriented nylon (BON), polyvinylidenechloride (PVDC), aluminium foil and linear low density polyethylene (LLDPE), the latter layer being the inner layer. The bag is produced by heat sealing two such laminate sheets along their peripheral edges, with the LLDPE layers of the two laminate sheets being in face to face relation. In such a bag, the nylon outer layer provides the necessary structural strength, the PVDC layer provides a secondary moisture barrier, and the foil layer provides the primary moisture barrier. The LLDPE inner layer provides a layer which can be heat sealed, this layer being heat sealed along its peripheral edge to the LLDPE inner layer of the other laminate sheet.

Another suitable material for forming the bag comprises a laminate sheet consisting of an outer layer of a metallized polyester, a middle layer of a metallized polyester, and an inner layer of ethylenevinyl acetate copolymer to enable heat sealing to the corresponding inner layer of an identical laminate sheet whereby to form the bag in the manner described above. The outer layer is metallized on its inner surface, for example with aluminium using a vacuum technique. The middle layer is identical to the outer layer but reversed so that the metallizing is on its outer surface whereby the two metallized layers face each other. In this laminate, the two metallized layers provide the moisture barrier, with the polyester layers providing the required strength. The polyester may consist of polyethylene terephthalate.

The above are only examples of suitable materials having the necessary characteristics, and other suitable materials may be used.

The outlet sleeve 4 comprises at its inner end an annular flange 4a which is welded to the inner layer of the bag, whereby to form a seal between the bag and the sleeve. The external surface of the bung 6 preferably comprises a series of annular sealing ribs in order to ensure that a moisture proof seal is defined between the sleeve 4 and bung 6. The outlet sleeve and bung may be formed from high or low density polyethylene.

The tubing may consist of a thermoplastic elastomer, such as ethylene-propylene-diene-monomer copolymer.

The bag is factory-filled with brake fluid or other hydraulic fluid through the outlet sleeve 4, the bung 6 and sealed tube 8 then being fitted in order to seal the bag. The fluid is dispensed from the bag by cutting off the sealed end 10 of the tube 8, enabling the fluid to flow from the end of the tube into a fluid reservoir, such as in the master cylinder of a vehicle braking system, the bag 2 collapsing upon discharge of the

fluid. The fluid flow through the tube 8 can be stopped by means of a clamp 12 mounted on the tube 8 and operative to constrict the tube.

Preferably, the clamp 12 comprises opposed rectilinear clamping elements 14 mounted on opposed arms 16 interconnected by a flexible web 18 suitably apertured to permit passage of the tube 8. The free end 20 of one of the arms 16 is bent over and is formed with a series of ratchet teeth 20a, this end also being apertured to permit passage of the tube 8. The free end of the other arm 16 is tapered to co-operate with the ratchet teeth 20a. To operate the clamp 12 to close the tube 8, the two arms 16 are simply squeezed together whereby to close the tube, the arms being retained in the clamping position by the co-operation between the ratchet teeth 20a and the tapered end of the arm. To release the clamp, the bent arm end 20a is flexed outwardly.

When the clamp 12 is operated to close the tube 8, the opposed walls of the tube are clamped together to form a moisture-proof barrier. The remaining fluid is stored in the collapsed bag 2. As dispensing of the fluid results in collapsing of the bag rather than ingress of air into the bag, the remaining fluid continues to be stored free from contact with moisture.

As shown in Figures 2 and 3, the bag 2 is preferably supplied in a box 20 having a carrying handle 22 at its upper end. An internal wall 24 close to the bottom of the box divides the box into two compartments, an upper large compartment, and a lower small compartment. The bag 2 is stored in the upper compartment, with the tubular outlet sleeve 4 and bung 6 projecting into the lower compartment through an aperture in the wall 24. The tube 8 is coiled for storage in the lower compartment. The bottom of the box is closed by a flap 26 which encloses the tube within the lower compartment, a central part of the flap 26 being perforated to permit removal in order to provide access to the tube preparatory to use. The box may be hung by means of its handle 22 from a suitable support to permit gravity feed of fluid from the bag through the tube and into the fluid reservoir, say of an automobile. For typical applications, the tube may be of about a metre in length.

The embodiment has been described by way of example only, and modifications are possible within the scope of the invention.

CLAIMS

1. A container for hydraulic fluid, said container comprising a closed flexible bag for containing the fluid, said bag being composed of a material which is inert with respect to hydraulic fluid and which is able to prevent moisture penetration to the interior of the bag, and an outlet fitting for dispensing of fluid from the bag, said outlet fitting including a flexible tube.

2. A container according to claim 1, wherein the tube is sealed closed at its outer end, said end being removable in order to permit discharge of fluid.

3. A container according to claim 1 or claim 2, further comprising releasable clamping means for closing the tube by squeezing the tube.

4. A container according to any one of claims 1 to 3, wherein the bag is formed from a laminate comprising a plastics layer and a metal foil layer.

5. A package comprising a closed flexible bag containing hydraulic fluid, said bag being composed of a material which is inert with respect to the hydraulic fluid and which is capable of preventing penetration of moisture through the bag wall, an outlet fitting leading from the bag for dispensing the fluid, and means for providing a seal against discharge of fluid through the outlet fitting.

6. A package according to claim 5, wherein the outlet fitting includes a flexible tube sealed at its outer end, said seal being removable in order to permit discharge of fluid.

7. A package according to claim 6, wherein the tube carries clamping means for closing the tube by squeezing the tube whereby to permit controlled dispensing of fluid after removing the seal.

8. A package according to any one of claims 5 to 7, wherein the bag is formed from a laminate comprising plastics inner and outer layers and a metal foil intermediate layer.

9. A package according to claim 8, wherein the outer layer is of a plastics which provides the laminate with structural strength, and the inner plastics layer is of a heat sealable plastics whereby the bag is formed by heat sealing two such laminates in face to face relation.

10. A package according to claim 9, wherein the outer layer consists of an outer layer of biaxially oriented nylon, intermediate layers of polyvinylidenechloride and aluminium foil, and an inner layer of polyethylene.

11. A package according to claim 6, or any claim dependent on claim 6, wherein the bag and tube are contained in a box having a handle by which the package can be hung for dispensing the fluid, with the tube suspended from the box.

12. A package according to claim 11, wherein the tube is packed within a lower portion of the box, said lower portion including a movable wall part to permit access to the tube.

13. A container substantially as hereinbefore described with reference to the accompanying drawings.

14. A package substantially as hereinbefore described with reference to the accompanying drawings.

Printed for Her Majesty's Stationery Office by
Croydon Printing Company (UK) Ltd, 2/87, D8817356.
Published by The Patent Office, 25 Southampton Buildings, London WC2A 1AY, from which copies may be obtained.